

specting the figure of the earth. It having been shown by Clairaut that the sum of the two fractions, expressing the ellipticity and the diminution of gravity, from the pole to the equator, is always a constant quantity, and equal to  $\frac{2}{3}$  of the fraction, expressing the ratio of centrifugal force, and that of gravity at the equator, it follows that if the decrease of gravity from the pole to the equator be subtracted from this constant quantity, the remaining fraction will express the ellipticity of the spheroid. The diminution of gravity may be known by finding the difference of the length of two pendulums, vibrating in equal times at the equator and pole, which are to each other directly as gravitation; but as such experiments cannot be made at the pole, Captain Kater proceeds to describe the means of obtaining the desired result by observations at intermediate stations; whence it appears that the length of the seconds pendulum at the equator, deduced from the observations at Unst and Dunnose, is 39.00527 inches, and gravitation at the equator 16.040 feet; hence the centrifugal force at the equator is  $\frac{1}{288}$  of gravitation, or  $\frac{1}{288}$  of gravity, which last being multiplied by  $\frac{2}{3}$  gives .0086505 for the sum of the fractions, expressing the ellipticity of the earth and diminution of gravity from the pole to the equator.

It appears from this result that, excepting the allowance for height above the sea's level, the error in the number of vibrations of the seconds pendulum at any particular station does not amount to  $\frac{1}{16}$ th of a vibration, which is about equal to 400,000th part of the length, consequently gravitation may be determined to this degree of accuracy by the apparatus employed; and in passing through a country composed of materials of various degrees of density, the pendulum may be expected to indicate such variations with much precision. Irregularities that are observed in the decrease between given latitudes, from the pole to the equator, are referable to this irregular attraction; thus the sudden increase of gravitation at Arbury Hill is referred by Captain Kater to the granite of Mount Sorrel in Leicestershire.

Though the details of M. Biot's experiments are not yet published, the author observes that it affords him no small gratification to learn that the acceleration of the pendulum between London and Unst, computed by that mathematician from his observations between Unst and Formentara, differs only 0".6 from the result of his own experiments,—a difference referable perhaps to the superior density of Unst compared with that of the substrata of London.

*The Croonian Lecture. A further Investigation of the Component Parts of the Blood. By Sir Everard Home, Bart. V.P.R.S. Read November 4, 1819. [Phil. Trans. 1820, p. 1.]*

In this communication Sir Everard announces the existence in certain animal structures of globules smaller than and independent of those ordinarily belonging to the blood; they were first remarked by Mr. Bauer, during the microscopic examination of the

coats of an aneurismal tumour; their number was in the proportion of one to four of the larger globules, and their diameter was  $\frac{1}{88000}$  of an inch in the larger in contact with the circulating blood; in the other layers they became more numerous, and in that longest coagulated were in the proportion of four to one.

In the section of an aneurismal tumour, the author notices the uncommon appearance of crystals of sulphate of lime with muriate and phosphate of soda, which, as well as the globules, he supposes to have been originally dissolved in the serum, since they are only brought to view by the act of coagulation.

In coagulable lymph deposited during violent inflammation, the same small globules were observed, mixed with a few colourless blood globules. The globules, stated by the author in a former lecture to have been produced in the serum, are also of a similar nature; and to distinguish them from the larger blood globules, he proposes to call them globules of lymph. In the buff of blood they were very numerous in the upper and firmest part, but the lower and softer layer consisted principally of blood globules.

A tumour in the prostate gland was found Mr. Bauer to contain both kinds of globules, and a considerable proportion of transparent jelly. The hard compact part of a tumour in the breast consisted chiefly of lymph globules and elastic jelly. In its softer part the blood globules predominated, so that the structure of these tumours is nearly allied to that of aneurismal sacs.

In buffy blood the proportion of aëriform matter, evolved under the exhausted receiver of the air-pump, was less than that of healthy blood, and appeared in excess in the blood drawn from the arm of a person an hour after a hearty meal. In the mucus of the pylorus and duodenum Mr. Bauer found lymph and blood globules. In the chyle he found the size of the globules various; those which were very small increased in size whilst under the microscope, and became as large as blood globules enveloped in their colouring matter; they appeared opaque and milk white. Mr. Bauer is satisfied, from these observations, that the globules of the blood are perfectly formed in the mesenteric glands, with the exception of colour, which they receive in the vessels of the lungs.

*The Bakerian Lecture. On the Composition and Analysis of the Inflammable Gaseous Compounds resulting from the Destructive Distillation of Coal and Oil, with some Remarks on their relative Heating and Illuminating Powers.* By William Thomas Brande, Esq. Sec. R.S. Prof. Chem. R. I. Read November 18, 1819. [*Phil. Trans.* 1820, p. 11.]

This paper is divided into two sections: in the first, the author's object is to show that no other compound of carbon and hydrogen can be demonstrated to exist except that usually termed *olefiant gas*, consisting of one proportion of carbon and one of hydrogen; and that the supposed compound of one of carbon and two of hydrogen, gene-